

OFFICE OF MANNED
SPACE FLIGHT

APOLLO PROGRAM

GUIDELINES FOR
**EVALUATION OF
SUPPLIER INSPECTION
PLAN**

BASED ON NPC200-3

JULY 1966



PREPARED BY
APOLLO PROGRAM OFFICE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. 20546

N70-75924
(ACCESSION NUMBER)

21
(PAGES)

TMX 65-295
(NASA CR OR TMX OR AD NUMBER)

None
(THRU)

None
(CODE)

None
(CATEGORY)

FACILITY FORM 602

July 1966

PREFACE

This guideline has been prepared as an aid to Apollo Program personnel (NASA, Government Agency, and Contractors) in the evaluation of a Supplier's Inspection Plan in accordance with the requirements of NPC 200-3, "Inspection System Provisions for Suppliers of Space Materials, Parts, Components, and Services." This guideline will provide assurance that all of the required inspection system provisions are considered in the evaluation of a Supplier's Inspection Plan. Comments and questions concerning this publication should be referred to the Apollo Program Office, Reliability and Quality Assurance, NASA, Washington, D.C. 20546.



George A. Lemke,
Director, Apollo
Reliability and Quality

INTRODUCTION

The Inspection Plan is the documented description of the supplier's inspection system for implementing the quality provisions of the contract, and requires careful preparation to ensure accuracy and completeness. Likewise, the evaluation of the Plan by the reviewing agency is equally important in determining how well the inspection system meets the contractual requirements.

This checklist of questions has been prepared as an aid to the reviewer to effectively evaluate the Plan. It is based on NPC 200-3 and is arranged in a similar format to assure that the reviewer has considered all of the inspection system requirements.

To make the evaluation a measurable quantity, a numerical rating system is included in this procedure. This means establishing a percentage figure to indicate a degree of coverage for each question in the checklist. Each question is to be considered on its own merit with equal importance for all questions. It must be emphasized that in establishing the percentage of coverage, only the content of the plan is to be considered in the evaluation. The reviewer should not consider other knowledge of the supplier's operation or the results of previous surveys or Plan submittals.

The ratings to be used are as follows:

| | |
|-----------------------|------|
| Not covered | 0% |
| Unacceptable coverage | 25% |
| Poor coverage | 50% |
| Good | 75% |
| Excellent | 100% |
| Not Applicable | NA |

The overall rating figure is obtained by a simple averaging of all of the applicable percentage figures.

The space provided at the right of the rating column is to be used for remarks, such as indicating corrective action, or defining the nonconformance, or any pertinent

comments regarding the specific question. For every question that does not rate 100% compliance, there should be a notation in the remarks column to indicate the reason for the less than 100% rating.

After completing the review, the reviewer should make a narrative summary of his observations based on the notations in the remarks column; include the numerical rating, note outstanding nonconformances to contractual requirements, and conclude with a recommendation for approval or disapproval of the Plan. In the case of disapproval, the quality areas that require corrective action or further negotiation with the supplier should be identified.

INSPECTION PLAN EVALUATION

Date _____

Center _____ Supplier _____

Stage or Vehicle _____

| SECTION 1.0 TITLE PAGE AND TABLE OF CONTENTS | | Percent Rating | Remarks |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| 1.1 | <p>Does Title Page include:</p> <ol style="list-style-type: none"> Title of document. Name and address of supplier. Equipment or articles under contract or on order. Contract number or purchase order number. Date of document. Name of person responsible for preparation of document. Signature or other indication of management approval. | | |
| 1.2 | <p>Does Table of Contents include:</p> <ol style="list-style-type: none"> Location of contents by section number and page. Reference to all applicable inspection specifications. List of figures. List of attachments of exhibits in Appendix. <ol style="list-style-type: none"> Organization charts. Flow charts. Reference documents. Schedules and milestones. | | |
| 1.3 | <p>Is there a revision index showing:</p> <ol style="list-style-type: none"> Subject of revision By whom revised. Approvals (supplier/NASA). Date of revision. Page and paragraph affected. | | |

INSPECTION PLAN EVALUATION

Date _____

Center _____ Supplier _____

Stage or Vehicle _____

| SECTION 2.0 BASIC REQUIREMENTS | | Percent Rating | Remarks |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| 2.1 | <u>General</u> Is there an introductory paragraph stating the supplier's policy and his approach regarding his inspection system. | | |
| 2.2 | <u>Scope</u> Is there a paragraph that clearly defines the areas covered by the Inspection Plan. | | |
| 2.3 | <u>Applicability</u> Are the applicable contractual inspection requirements documents listed; i. e., NPC 200-3, MIL-Q-9858, etc., or portions thereof. | | |
| 2.4 | Are contractual exceptions to NPC 200-3 defined. | | |
| 2.5 | <u>Relation to Detail Requirements</u> Is the subject of conflict between NPC 200-3 and the contractual requirements mentioned in the plan, and does the contract govern. | | |
| 2.6 | <u>Relation to Reliability Requirements</u> If a reliability plan is required, are the functional overlaps with this Inspection Plan defined. | | |

INSPECTION PLAN EVALUATION

Date _____

Center _____ Supplier _____

Stage or Vehicle _____

| SECTION 2.0 BASIC REQUIREMENTS | | Percent Rating | Remarks |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| 2.7 | <u>Revision Procedure</u> Is there a section outlining the procedure for revisions to the Inspection Plan, including: <ol style="list-style-type: none"> Review with cognizant NASA installation. NASA approval prior to implementation. Organization responsible for initiating revisions. Schedule of reviews. | | |
| 2.8 | <u>Inspection System</u> Is there an organization chart showing relationship of the inspection function to other supplier functions. The organization chart, which is a requirement of the inspection plan, should show the supplier's complete organizational functions with details of the inspection organization. Relationships of the inspection function with other organizational components should be indicated. | | |
| 2.9 | Are inspection participations in other supplier functions defined or indicated. | | |
| 2.10 | Are functions and responsibilities of each inspection element defined. | | |
| 2.11 | Is there a flow chart showing locations of inspection and test control points, and a brief description of inspection and tests performed at each station. | | |

INSPECTION PLAN EVALUATION

Date _____

Center _____ Supplier _____

Stage or Vehicle _____

| 2.0 BASIC REQUIREMENTS | | Percent Rating | Remarks |
|------------------------|------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | 2.12 | | <u>Drawing and Change Control</u> Is there a change control system that provides for controlled distribution, usage, and removal of all control documents and changes thereto that affect the inspection program. |
| | 2.13 | | Are product, test, special process, and material specifications in the change control system. |
| | 2.14 | | Are inspection and test procedures, instructions, and related documents in the change control system. |
| | 2.15 | | Are processing instructions and related documents in the change control system. |
| | 2.16 | | Are operating instructions and related documents in the change control system. |
| | 2.17 | | Are drawings, drawing changes, and engineering change orders in the change control system. |
| | 2.18 | | Does this system describe a method of distribution and checkout of control documents, such as signoff, signout, etc., and records of location of all documents. |
| | 2.19 | | Does the change control system require that changes in documents that affect the quality or inspection program are to be reviewed by the inspection activity prior to becoming effective. |

INSPECTION PLAN EVALUATION

Date _____

Center _____ Supplier _____

Stage or Vehicle _____

| SECTION 2.0 BASIC REQUIREMENTS | | Percent Rating | Remarks |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| 2.20 | Is there indication of review or approval of changes, such as "signoff" of documents. | | |
| 2.21 | Does the change control system require that points of effectivity of changes be clearly defined. | | |
| 2.22 | Does the change control system provide for retention of records that indicate incorporation of changes and define points of effectivity. | | |
| 2.23 | Does the change control system require that all changed articles are so identified and inspected and/or tested. | | |
| 2.24 | Is there a flow chart delineating the sequential steps in each change procedure. | | |

INSPECTION PLAN EVALUATION

Date _____

Center _____ Supplier _____

Stage or Vehicle _____

| SECTION 3.0 DETAILED INSPECTION SYSTEM REQUIREMENTS | | Percent Rating | Remarks |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| 3.1 | <u>Control of Procurement Sources</u> Is there a referenced written procedure controlling procurement activities on Government contracts. This should be a detailed procedure outlining all of the steps necessary to place orders on vendors. | | |
| 3.2 | Do the procedures define the requirements for supplier source inspection. | | |
| 3.3 | Do procedures require review of procurement documents by the quality function to ensure inclusion of quality and technical requirements. | | |
| 3.4 | Do procedures require that adequate records of tests and inspections performed at source are maintained. | | |
| 3.5 | Do procedures require that the quality organization approves or reviews the selection of vendors; is the basis for vendor approval indicated, such as past quality history, vendor survey, etc. | | |
| 3.6 | Is there a procedure for maintaining a quality history for each vendor. | | |
| 3.7 | <u>Government Source Inspection Requirements</u> Are purchasing documents required to include provisions for Government source inspection requirements including one of the two quotes in Section 3.2 of NPC 200-3. | | |

INSPECTION PLAN EVALUATION

Date _____

Center _____ Supplier _____

Stage or Vehicle _____

| SECTION 3.0 DETAILED INSPECTION SYSTEM REQUIREMENTS | | Percent Rating | Remarks |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| 3.8 | <u>Government Furnished Property (GFP)</u> Are there procedures for control of Government furnished property. | | |
| 3.9 | Do these procedures include provision for: <ul style="list-style-type: none"> a. Inspection upon receipt of GFP. b. Protection, periodic inspection, and controls necessary to preclude damage. c. Functional testing prior to further processing. d. Reporting to cognizant NASA installation any failures or deficiencies discovered during inspection and testing. e. Control of deficient GFP to prevent further deterioration or damage. f. Customer approval prior to disassembly or modification of GFP. | | |
| 3.10 | <u>Identification, Handling, and Storage of Material</u> Are there procedures for identification, handling, and storage of all material. | | |
| 3.11 | Are these procedures designed to prevent damage, deterioration, loss, or substitution from the time material is received until delivery to customer. | | |
| 3.12 | Do procedures require that incoming material is identified as to source and contract for which procured and this identification is maintained in manufacturing records throughout the manufacturing process. | | |

INSPECTION PLAN EVALUATION

Date _____

Center _____ Supplier _____

Stage or Vehicle _____

| SECTION 3.0 DETAILED INSPECTION SYSTEM REQUIREMENTS | | Percent Rating | Remarks |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| 3.13 | Do procedures provide for identification of all purchased articles to indicate acceptance or rejection after release from incoming inspection. | | |
| 3.14 | Do procedures require that all materials subject to age deterioration, such as synthetic rubber, are marked to indicate the date at which useful life was initiated, or the date at which useful life will be expended. | | |
| 3.15 | Do procedures require a listing to be maintained of all limited shelf-life items. | | |
| 3.16 | Do procedures provide for maintenance of stocks in such a manner that dated material is easily identified. | | |
| 3.17 | Do procedures require that stock records are reviewed periodically to eliminate outdated material. | | |
| 3.18 | Do procedures require removal and disposition of material which has reached the limit of its shelf-life. | | |
| 3.19 | Do procedures call for special handling devices such as special carts, boxes, containers, and transportation vehicles for use to prevent damage to delicate parts during fabrication. | | |
| 3.20 | <u>Control of Raw Materials</u> Is there a description of the procedure for controlling raw material. | | |

INSPECTION PLAN EVALUATION

Date _____

Center _____ Supplier _____

Stage or Vehicle _____

| SECTION 3.0 DETAILED INSPECTION SYSTEM REQUIREMENTS | | Percent Rating | Remarks |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| 3.21 | Are there provisions for chemical and physical tests to determine conformance to applicable specification. | | |
| 3.22 | Are test specimens required for certain raw materials that require destructive tests for determining conformance. | | |
| 3.23 | Is there a listing of the raw materials contractually requiring test specimens. | | |
| 3.24 | Is the physical separation of raw materials into the following categories required: <ul style="list-style-type: none"> a. Materials awaiting inspection. b. Materials accepted by inspection and ready for use. c. Materials rejected by inspection and subject to rework, return to vendor, or scrap. | | |
| 3.25 | <u>Inspection and Tests</u> Is there a factory test and inspection plan showing characteristics to be tested, test station, and test equipment required to determine conformance to specifications. | | |
| 3.26 | Are the detailed inspection or test procedures for each operation of test and inspection referenced for submittal as supplements to this plan or attached as exhibits in appendix. | | |

INSPECTION PLAN EVALUATION

Date _____

Center _____ Supplier _____

Stage or Vehicle _____

| SECTION 3.0 DETAILED INSPECTION SYSTEM REQUIREMENTS | | Percent Rating | Remarks |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| 3.27 | Do inspection and test procedures cover all phases of the supplier's manufacturing activity from incoming inspection through to shipping: a. Receiving. b. Processing. c. Fabrication. d. Assembly. e. End Item. f. Shipping. | | |
| 3.28 | <u>Process Controls</u> Are there procedures for control of special processes to ensure compliance with quality requirements. These special processes include plating, anodizing, radiography, magnetic particle and liquid penetrant inspection, heat treating, welding, soldering, etc. | | |
| 3.29 | Do procedures require that machines, equipment, and procedures used in special process operations are certified when required by contract. | | |
| 3.30 | Is there a listing of these special processes that require certification. | | |
| 3.31 | Do procedures require that records of in-process inspections and tests are maintained. | | |

INSPECTION PLAN EVALUATION

Date _____

Center _____ Supplier _____

Stage or Vehicle _____

11

| SECTION 3.0 DETAILED INSPECTION SYSTEM REQUIREMENTS | | Percent Rating | Remarks |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| 3.32 | Does procedure require that the quality organization review the procedures for process control and conduct audits to determine conformity with approved methods and procedures. | | |
| 3.33 | Do process control procedures require that operator personnel are certified for critical processes. | | |
| 3.34 | Do procedures make provision for recertification tests of machines, processes, and personnel. | | |
| 3.35 | <u>Nonconforming Material</u> Is there a procedure for control of nonconforming material. | | |
| 3.36 | Do procedures require that nonconforming articles be identified and segregated from normal work operations. | | |
| 3.37 | Do procedures require that the cognizant NASA installation be advised of any minor nonconformance with the suggested repair procedure for such nonconformance. | | |
| 3.38 | Do procedures provide for feedback of nonconformance information to responsible vendor. | | |
| 3.39 | Do procedures require approval by cognizant NASA installation for disposition of nonconforming material. | | |

INSPECTION PLAN EVALUATION

Date _____

Center _____ Supplier _____

Stage or Vehicle _____

12

| SECTION 3.0 DETAILED INSPECTION SYSTEM REQUIREMENTS | | Percent Rating | Remarks |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| 3.40 | Do procedures require that records of all waivers or approvals of nonconforming articles are maintained and such articles identified. | | |
| 3.41 | Do procedures require that records of all actions on nonconforming material are maintained in a manner to readily show recurring defects. | | |
| 3.42 | Does the procedure require that technical recommendation regarding disposition of nonconforming material is made by cognizant design and quality control personnel. | | |
| 3.43 | Do procedures require that material dispositioned as scrap is clearly marked and controlled to preclude further use. | | |
| 3.44 | <u>Control of Inspection, Measuring, and Test Equipment</u> Are there provisions for selection, evaluation, and maintenance of suitable inspection, measuring and test equipment. | | |
| 3.45 | Is there a procedure for the control of inspection, measuring, and test equipment. | | |
| 3.46 | Do procedures require that the quality activity approves the design and application of inspection, measuring, and test equipment. | | |

INSPECTION PLAN EVALUATION

Date _____

Center _____ Supplier _____

Stage or Vehicle _____

13

| SECTION 3.0 DETAILED INSPECTION SYSTEM REQUIREMENTS | | Percent Rating | Remarks |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| 3.47 | Do procedures require that each item of inspection, measuring, and test equipment have an operational check prior to initial use. | | |
| 3.48 | Do procedures provide for recalibration of inspection, measuring, and test equipment at specified intervals to assure continued accuracy, and are the dates of calibration and due date for subsequent calibration displayed on the equipment. | | |
| 3.49 | Do procedures require that calibrations are made against standards having relationship certified traceable to National Bureau of Standards. | | |
| 3.50 | Do procedures require that items of inspection, measuring, and test equipment that have not been maintained or calibrated at established intervals or found to be outside calibration limits are removed from service. | | |
| 3.51 | Do procedures require that all tools, gages, jigs, and fixtures, which control dimensions affecting quality characteristics, are initially checked prior to use. | | |
| 3.52 | Do procedures require that there are established intervals for rechecking tools, gages, jigs, and fixtures. | | |

INSPECTION PLAN EVALUATION

Center _____ Supplier _____

Date _____

Stage or Vehicle _____

| SECTION 3.0 DETAILED INSPECTION SYSTEM REQUIREMENTS | | Percent Rating | Remarks |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| 3.53 | Do procedures require that records of calibration and certification of inspection, measuring, and test equipment are retained. | | |
| 3.54 | Is there indication of supplier maintaining a control area from which inspection, measuring, and test equipment is serviced and controlled. | | |
| | <u>Indication of Inspection Status</u> | | |
| 3.55 | Is there a description of an inspection stamp, decal, or seal system, which clearly identifies the inspection status of articles at all points in the manufacturing process. | | |
| 3.56 | Does the inspection stamp control system identify the individual performing the inspection. | | |
| 3.57 | Does the stamp system require that inspection stamps are applied directly to the article where practical; if not, are they applied to the containers or accompanying labels. | | |
| 3.58 | Do the supplier's inspection stamps differ from the Government inspection stamps. | | |
| | <u>Preservation, Packaging, Packing, and Shipping</u> | | |
| 3.59 | Is there a description of the procedure for the preservation, packaging, packing, and shipping of articles to provide necessary protection of all articles throughout the manufacturing phase to prevent loss, damage, degradation, and substitution. | | |

INSPECTION PLAN EVALUATION

Date _____

Center _____ Supplier _____

Stage or Vehicle _____

| SECTION 3.0 DETAILED INSPECTION SYSTEM REQUIREMENTS | | Percent Rating | Remarks |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| 3.60 | Does the supplier show evidence of complying with ICC rules and regulations for packing, marking, and shipping of articles provided these items are not contractually specified. | | |
| 3.61 | Is the responsibility for quality verification established for the areas of preservation, packaging, packing, and shipping. | | |
| 3.62 | Are requirements established for preservation of articles subject to corrosion or deterioration during manufacturing, storage, and in the packaged state. | | |
| 3.63 | Are packaging methods established and documented. | | |
| 3.64 | Do procedures require that the inspection activity verifies that only articles having all processes and final inspection of articles completed are packed. | | |
| 3.65 | Do procedures require that the inspection activity verifies that all articles are properly identified and marked according to applicable specifications. | | |
| 3.66 | Do procedures require that the inspection activity verifies that all articles ready for shipment have all of the required documentation with the articles. | | |
| 3.67 | <u>Sampling Inspection</u> Is there a description of the sampling plans that are to be used. | | |

INSPECTION PLAN EVALUATION

Date _____

Center _____ Supplier _____

Stage or Vehicle _____

| SECTION 3.0 DETAILED INSPECTION SYSTEM REQUIREMENTS | | Percent Rating | Remarks |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| 3.68 | Are sampling plans in accordance with applicable military documents MIL-STD-105, MIL-STD-414, or handbooks Numbers 106, 107, and 108. | | |
| 3.69 | Are sampling plans other than the military type proposed to be used; if so, are they contractually required or approved by the cognizant NASA installation. | | |
| 3.70 | <u>Records of Inspections and Tests</u> Do procedures require that records of all inspections and tests are retained for the required period and are available to the cognizant NASA installation. | | |
| 3.71 | Do procedures require that test records include part or component identification, inspection or test involved, number of conforming articles, number rejected, nature of defect, and cause for rejection. | | |
| 3.72 | Do procedures require that the test equipments used in making critical measurements are identified in test reports, including model, name, drawing numbers, serial number, and calibration status. | | |
| 3.73 | <u>Corrective Action</u> Is there a description of the corrective action procedure. | | |
| 3.74 | Is responsibility for corrective action established. | | |

INSPECTION PLAN EVALUATION

Date _____

Center _____ Supplier _____

Stage or Vehicle _____

17

| SECTION 3.0 DETAILED INSPECTION SYSTEM REQUIREMENTS | | Percent Rating | Remarks |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| 3.75 | Do procedures include the requirement of immediate notification to the applicable supplier function that corrective action is required. | | |
| 3.76 | Do procedures require that failure analyses are performed on all deficiencies requiring corrective action and are reported directly to the supplier function responsible for corrective action. | | |
| 3.77 | Do procedures require follow up in all deficiencies to ensure corrective action. | | |
| 3.78 | Do procedures require that all occasions of corrective action, failure analysis, and follow up, are documented in reports to management. | | |
| 3.79 | Does the nonconforming material procedure require that samples of deficient or failed articles be made available to the cognizant NASA installation. | | |
| 3.80 | Do procedures require that repetitive defects, regardless of classification, are given the proper attention to assure corrective action. | | |
| 3.81 | Is there a listing of Inspection, Measuring, and Test Equipment available for use by inspection and test personnel. | | |